

CLAIMS

39. (*New*) A device for modulating neuronal activity, said device comprising:
- (a) a housing having a surface biocompatible with at least a portion of a neuronal cell;
 - (b) an aperture in said surface;
 - (c) a reservoir connected to said aperture; and
 - (d) a flow regulator in operable relationship with fluid in said reservoir for moving said fluid to said aperture.
40. (*New*) The device according to claim 39, wherein said flow regulator is an electromechanical device.
41. (*New*) The device according to claim 39, wherein said flow regulator is an electrical device.
42. (*New*) The device according to claim 39, wherein said surface is micropatterned for directing a neuronal cell process toward said aperture.
43. (*New*) The device according to claim 39, wherein said fluid comprises a bioactive agent.

44. (*New*) A device for modulating neuronal activity, said device comprising:
- (a) a housing having at least one aperture and a surface biocompatible with at least a portion of a neuronal cell, said surface being micropatterned for directing growth of a neuronal cell process to said aperture;
 - (b) a reservoir connected by a channel to each said aperture; and
 - (c) an electrically controlled flow regulator in operable relationship with fluid in said reservoir for moving said fluid to said aperture.
45. (*New*) The device according to claim 44, wherein said micropattern comprises bioactive agents and directs growth of said neuronal cell process to said aperture.
46. (*New*) The device according to claim 44, wherein said device comprises at least one photodiode.
47. (*New*) The device according to claim 44, wherein said surface comprises a well, said aperture connecting said well with said reservoir.
48. (*New*) A device for modulating neuronal activity, said device comprising:
- (a) a housing of a flexible material having a surface biocompatible with at least a portion of a neuronal cell;
 - (b) an aperture in said surface;
 - (c) a reservoir connected to said aperture; and

- (d) a flow regulator in operable relationship with fluid in said reservoir for moving said fluid to said aperture.
49. (New) The device according to claim 48, wherein said flexible material is a polysiloxane.
50. (New) The device according to claim 48, wherein said housing is comprised of two layers:
- (a) a first layer comprising at least one reservoir and at least one channel, each of said at least one reservoir connected to one of said at least one channel; and
 - (b) a second layer covering said first layer enclosing said at least one reservoir and said at least one channel and having an aperture in communication with said at least one reservoir.
51. (New) The device according to claim 50, wherein said second layer is micropatterned for directing growth of a neuronal process to said aperture.
52. (New) The device according to claim 48, wherein said fluid comprises a bioactive agent.
53. (New) The device according to claim 48, wherein said flow regulator is an electromechanical device.

54. *(New)* The device according to claim 53, wherein said device comprises photodiodes and said electromechanical device is actuated by photodiodes.
55. *(New)* The device according to claim 48, wherein said flow regulator is an electrical device.
56. *(New)* The device according to claim 55, wherein said device comprises photodiodes and said electrical device is actuated by photodiodes.
57. *(New)* A method for stimulating a neuronal cell, said method comprises inserting in proximity to a neuronal site a device according to claim 1, wherein said fluid comprises a bioactive agent.
58. *(New)* The method according to claim 57, wherein said neuronal site is a retinal site.
59. *(New)* The method according to claim 57, wherein said bioactive agent is a neurotransmitter.
60. *(New)* A method for stimulating a neuronal cell, said method comprises inserting in proximity to a neuronal site a device according to claim 48, wherein said fluid comprises a bioactive agent.

61. (New) A device for modulating neuronal activity, said device comprising:
- (a) a housing having a surface biocompatible with at least a portion of a neuronal cell;
 - (b) an aperture in said surface;
 - (c) a reservoir connected to said aperture; and
 - (d) a flow regulator in operable relationship with fluid in said reservoir for moving said fluid to said aperture, wherein said flow regulator comprises at least one of a flexible housing, a flexible membrane pump or a light sensitive polymer flow regulator.